VALVE FOR THE DISPENSING OF FLUID PRODUCTS, AND DISPENSER COMPRISING SUCH A VALVE

This present invention concerns a valve for the dispensing of fluid products, more particularly a metering valve, as well as a fluid product dispenser comprising such a valve.

Metering valves are well known in the state of the art. They are generally designed to dispense products of the aerosol type, in which the fluid product is dispensed by means of a propellant. These valves generally include a valve body in which a valve element or valve stem slides between a rest position and a dispensing position. The valve body forms a metering chamber, this metering chamber being emptied during the actuation of the valve element. After actuation, when the valve element returns to its rest position, the metering chamber is connected to the reservoir and it fills, generally by gravity, to allow the next actuation of the valve. These known valves can have a certain number of disadvantages. Thus, in the rest position of the valve, in particular when the latter is in the upright position, that is with the valve positioned above the reservoir, the product contained in the metering chamber is liable to flow back toward the reservoir, thus affecting the accuracy of the metering as well as the repeatability of the measured dose. In addition, the filling of the reservoir with the fluid product and the propellant can prove to be complicated and damaging for the valve. Document US-4,597,512 reveals a valve with a valve element that has two parts, an upper part and a lower part, which are actuated simultaneously.

An objective of the present invention is to provide a valve for the dispensing of a fluid product, which does not have the aforementioned disadvantages.

More particularly, an objective of the present invention

is to provide such a valve which achieves perfect metering accuracy as well as perfect repeatability of the measured dose at each actuation of the valve.

The present invention also has as objective to provide such a valve which is simple and inexpensive to manufacture, to assemble, to fill and to use.

The present invention therefore provides a valve for the dispensing of fluid products intended to be fitted to a reservoir containing a fluid product, said valve having a valve body that includes a metering chamber, the valve including a first valve element intended to dispense the product contained in the metering chamber, and a second valve element intended to fill said metering chamber. Preferably, said first and second valve elements are operated separately during the use of the valve.

Advantageously, said first and second valve elements are actuated together to fill the reservoir with the fluid product.

Advantageously, said second valve element is positioned around said first valve element, said first valve element sliding in a sealed manner within said second valve element.

Advantageously, each valve element fits onto an elastic element, such as a spring, which the forces it to its rest position.

Advantageously, the actuating means of the first valve element are different from the actuating means of the second valve element.

Advantageously, said second valve element forms, together with the valve body, an intake valve to the metering chamber, said second valve element being movable with respect to the valve body, between a closed position and an open position of said intake valve.

Advantageously, said intake valve is formed by a lateral passage provided in a wall of the second valve element, said passage being closed in the closed position of the intake valve and open in the open position of the intake valve.

Advantageously, said first valve element forms, together with said second valve element, an outlet valve for the metering chamber, said first valve element being movable with respect to said second valve element between a closed position and an open position of said outlet valve.

Advantageously, said outlet valve is formed by a lateral passage provided in said first valve element, said passage being closed in the closed position of the outlet valve and opening into the metering chamber in the open position of the outlet valve.

Advantageously, the valve body is made in two parts, fixed together, in particular by snap-fit.

Advantageously, in the rest position of the valve, the metering chamber is closed hermetically with respect to the reservoir and the exterior.

The present invention also provides a device for the dispensing of fluid products, including a reservoir containing a fluid product and a propellant, as well as a valve as described above.

Advantageously, said reservoir is filled by means of a filling machine which simultaneously actuates the first and second valve elements.

Other characteristics and advantages of the present invention will appear more clearly during the following detailed description of an advantageous embodiment of the latter, presented with reference to the attached drawings, provided by way of non-limited examples, and in which:

figure 1 is a schematic view in transverse section of a valve according to an advantageous embodiment of the present invention, in the rest position;

figure 2 is a similar view to that of figure 1, in the dispensing position;

figure 3 is a similar view to those of figures 1 and 2, in the filling position of the metering chamber; and

figure 4 is a similar view to those of figures 1 to 3, in the filling position of the reservoir.

With reference to the figures, the valve comprises a valve body 10 forming a metering chamber 20. The valve body 10 can be made in two parts, one part described as the top or upper part 11 which includes the metering chamber 20 and to which is fixed, in a sealed manner, in particular by a snap-fit, a bottom or lower part 12. This lower part 12 (which appears at the top in the figures, since the valve is shown in the inverted position), can be made as a single-block part with a ring 13, called the can-end ring, and which is used firstly to limit the dead volume and therefore to dispense a maximum of the product contained in the reservoir, and secondly to limit the contact between the product and the gasket positioned between the valve body and the attachment element. This attachment element 70 can be anything, and is used to fix the valve onto the neck of a reservoir (not shown), in a known manner. This attachment element 70 can, in particular, be a capsule to be crimped, screwed or snap-fitted, or similar.

According to the invention, the valve comprises a first valve stem element 30 and a second valve stem element 40. The first valve element 30 is intended to dispense the product contained in the metering chamber 20 and the second valve element 40 is intended to fill this metering chamber 20 from the reservoir (not shown). The present invention therefore

allows decoupling of the expulsion of the measured dose from the filling of the metering chamber, in contrast to a conventional valve, in which the filling of the metering chamber is achieved during the return of the valve element from its dispensing position to its rest position. Said first and second valve elements 30, 40 are actuated separately during the use of the valve. In other words, the dispensing of the product, effected by means of the first valve element 30, is achieved by operating specific actuating means, such as a pusher mounted on the outlet end of the first valve element 30, and movable axially, in a known manner. The second valve element 40, which is used to fill the metering chamber 20 after expulsion of the aforementioned measured amount, is advantageously actuated by means of an actuating system that is distinct from the actuating system of the first valve element 30. For example, a lateral actuating system can be envisaged, to avoid any risk of the simultaneous operation of the two valve elements.

Advantageously, the second valve element 40 is positioned around the first valve element 30, which slides in said second valve element 40 in a sealed manner. Advantageously, a sealing gasket 80 is provided between the two valve elements 30 and 40, resulting in sealed movement in all positions of the valve elements. Another sealing gasket 81 can be provided between the two valve elements, in order to guarantee sealing in the rest position of the first valve element 30.

A particular advantage of the present invention is that in the rest position of the valve, the metering chamber 20 is completely and hermetically isolated from the exterior and from the reservoir, so that there is no risk of losing any of the measured dose, guaranteeing absolute metering accuracy as well as total repeatability at each actuation, even after lengthy storage. In addition, the fact that filling the

metering chamber is independent of the actuation or return stroke of the first valve stem or element 30 enables this filling action to be optimised in order to ensure good homogeneity of the product and of the propellant contained in the metering chamber after it has been filled. It should be noted that the metering chamber can be filled just after the expulsion of the aforementioned measured dose. In a variant, the chamber can be filled just before the expulsion of the measured dose, so that the measured dose is not held for too long in the chamber.

Advantageously, each valve element 30, 40 fits, directly or indirectly, onto an elastic element 35, 45 respectively, such as a spring, which forces it toward its rest position. This rest position is shown in figure 1. As can be seen in the figures, the second valve element 40 is advantageously positioned around the first valve element 30, with this first valve element 30 sliding in a sealed manner inside the second valve element 40. Figures 1 and 2 show a cycle of the dispensing operation of the valve. In order to dispense the contents of the metering chamber 20, the first valve element 30 is therefore moved axially inside the second valve element 40 until a lateral passage 61, provided in said first valve element 30, opens into in said metering chamber 20, causing expulsion of the measured dose. The second valve element 40 remains immobile during this dispensing of the product. The first valve element 30 therefore forms an outlet valve 60 for the metering chamber 20, with respect to the second valve element 40. During the whole cycle of operation of the first valve element 30, the metering chamber remains closed and completely isolated with respect to the reservoir, as can be seen in figures 1 and 2. Figure 3 shows the filling of the metering chamber 20 after a preceding actuation. To this end, the second valve element 40 is moved axially inside the valve

body 10, in particular inside the upper part of the valve body 11, until a lateral passage 51 provided in a wall 41 of said second valve element 40 connects the reservoir (not shown) with the metering chamber 20. The second valve element 40 therefore forms an intake valve 50 for the metering chamber, together with the valve body 10. During the displacement of the second valve element 40 toward its filling position, the first valve element 30 always remains in the closed position of the discharge valve 60 of the metering chamber 20, so that there is no risk of losing product during this filling stage. The first valve element 30 is driven axially by the second valve element 40 during this filling cycle of the metering chamber 20, but since there is no relative displacement between the two valve elements, the discharge valve 60 remains closed.

Advantageously, the second valve element 40 can be made in two parts, fixed together, an upper part 41 forming a wall of the metering chamber 20, and a lower part 42 fixed to said first upper part 41. These two parts 41, 42 can form said lateral passage 51 between them. The lower part 42 can form the support for the spring 35 of the first valve element 30, while the spring 45 of the second valve element 40 can also cooperate with said lower part 42 as well as with the bottom of the valve body 12.

Another very important advantage of the present invention concerns the filling of the reservoir before the valve is actuated to dispense the product in measured doses. In fact, as illustrated in figure 4, this filling can be accomplished through the first dispensing valve element 30 without damaging the valve. To this end, the two valve elements 30 and 40 are actuated simultaneously, via an appropriate filling machine or filling head for example, and are lowered on a precise trajectory so as to open the outlet valve 60 of the metering

chamber and the intake valve 50 of the metering chamber simultaneously. In this way, the reservoir (not shown) is connected to the outlet orifice of the first valve element 30, and the product can therefore be fed via this passage to enter into the first valve element 30, then into the metering chamber 20, and then into the reservoir (not shown), without damaging the functional gaskets, as in the current valves.

The present invention therefore proposes a valve which firstly performs metering with absolute accuracy, and which simplifies filling of the reservoir, this being achieved by decoupling the dispensing action of the metering chamber from its filling after the dispensing actuation.

Although the present invention has been described with reference to an advantageous embodiment of the latter, it is intended that it should not be limited to this embodiment only. On the contrary, someone skilled in the art will be able to carry out any necessary modifications without moving outside the same of the invention as described in the appended claims.